Remarks

Applicant respectfully requests reconsideration of this application. Claims 45, 47, 51, 55, 58, 62, and 66 have been amended. None of the claims have been allowed.

Information Disclosure Statement

Applicant wishes to disclose the status of other applications that may be considered related to the present application, as follows: serial no.: 10/315,624 (Office Action rejecting all pending claims mailed 08/20/08); serial no.: 10/315,788 (Final Office Action rejecting all pending claims mailed 08/20/08); serial no.: 10/889,326 (Office Action rejecting all pending claims mailed 08/21/08); serial no.: 10/315,694 (Office Action rejecting all pending claims mailed 06/30/08); serial no.: 10/619,919 (Office Action rejecting all pending claims mailed 05/01/08); serial no.: 10/367,178 (Office Action rejecting all pending claims mailed 04/25/08); serial no.: 10/608,594 (Office Action rejecting all pending claims mailed 08/07/08); serial no.: 10/367,197 (Office Action rejecting all pending claims mailed 05/01/08); serial no.: 10/395,749 (Final Office Action rejecting all pending claims mailed 07/16/08); and serial no.: 10/407,445. (Office Action rejecting all pending claims mailed 06/26/08). Applicant also wishes to disclose that in related application no. 11/800,543 an Office Action mailed 07/29/08 allowed claims 39-41 and rejected claims 10, 11, 14-17, 19-21 and 30-38.

Traversal of Claim Rejections Under 35 U.S.C. § 103(a)

Claims 5, 12, 17, 18, 20-25 and 31-33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lau in view of Heinonen et al. (US 6,968,153 "Heinonen"). Applicant respectfully traverses this ground of rejection.

Lau teaches the user of low-power transceivers in channel-shifting RF repeaters to create a wireless network that can extend beyond each transceiver's useful range. A base station controls the allocation of time on one or more available channels between competing transmitters, and may also control the function of the channel-shifting repeaters. When a given transmitter is transmitting, repeaters in range of that transmitter receive the signal, channel-shift the signal, and retransmit it. (Column 4, lines 6-19)

Lau, however, fails to teach or disclose a repeater comprising a first transceiver operable to receive data transmitted on a first channel of a first frequency band during odd time intervals, a second transceiver coupled to the first transceiver, the second transceiver operable to transmit data on the first channel of the first frequency band during even time intervals, the second transceiver not transmitting during the odd time intervals; and a third transceiver coupled to the first and second transceivers, the third transceiver operable to transmit and receive data in a second frequency band, as recited, for example, in amended claim 45. Lau also fails to teach pipelining transmissions from repeater-to-repeater in specific time intervals so as to maintain the efficiency of the throughput of the wireless network as set forth in amended claim 55.

The multiple transmitters and receivers referred to by Lau are source and destination devices. This is explicitly disclosed in column 5, lines 11-15, which states, "Each T/R module is connected to at least one digital data device 60, 66, 72, 76, 82 (each device being a source and/or a sink of digital data)." Note that Lau teaches each repeater having two antennas, indicating that each of his repeaters has two independent RF transceiver subsystems, each for handling communications on a different frequency.

In addition, Lau discloses that his repeaters are receiving and transmitting *simultaneously*, which is contrary to the language of Applicant's amended claims. Lau's teaching of simultaneously transmitting and receiving data by his wireless repeaters is pervasive throughout his disclosure. For example, in column 6, line 25-31, he explicitly acknowledges that it may be necessary to "re-use" channels and that doing so creates a risk of feedback. The risk of feedback is precisely due to the fact that Lau's repeaters are receiving and transmitting at exactly the same time. This is the same effect one hears when a public address system microphone is placed in front of its speaker: since the audio signal (or RF signal in Lau's case) is being transmitted at the same time it is received, the repeated transmission may picked up again by the receiver and retransmitted once more, getting louder and louder, in an uncontrolled feedback loop.

Furthermore, Lau explicitly teaches away from the approach of the amended claims by disparaging systems that utilize CSMA/CA techniques, wherein one transceiver communicates with another transceiver on a channel only when the channel is not already in use (see column 2, lines 25-37). Instead, Lau teaches that the problems associated with such an approach are to be overcome through the use of repeaters having multiple transceivers that transmit and receive simultaneously on different frequency channels. As such, Applicant respectfully submits that prima facie obviousness is lacking with respect to claims 5, 12, 17, 18, 20-25 and 31-33 since the prior art teaches away from the claimed invention. *See e.g., In re Haruna*, 249 F.3d 1327, 1335 (Fed. Cir. 2001).

Lau acknowledges that when he simultaneously transmits and receives on adjacent frequencies there is a problem with the transmitter saturating a nearby receiver. (See Figure 9, and Col 6 starting on line 53.) For instance, Lau states (line 58): "The guard band allows a repeater (or T/R module) to transmit on one channel

without saturating the receiver amplifier operating on the other channel, thus enabling simultaneous reception and transmission." Lau's thus implicitly assumes in establishing guard bands is that the repeaters and T/R's can frequencies can be selected arbitrarily so that the guard bands can use as little spectrum as possible (e.g. Fig 9 shows a guard band that is much narrower than the spectrum for either CH1 or CH2) . This flexibility is rarely the case, either in unlicensed ISM spectrum or in licensed cellular spectrum because to be compatible with existing 802.11x devices or existing cell phones, the current channel allocations must be utilized, and they generally are not allocated with guard bands.

Lau fails to disclose or suggest the claimed subject matter in any respect. Indeed, he teaches away from the amended claims and assumes an ideal world, while the invention of the claims at issue cost-effectively solves the real-world problem of how to transmit wirelessly in an environment where there is no arrangement of frequency shiftings available to achieve non-interfering, continuous repeating. Note that the claimed subject matter accomplishes this practical result at the cost of about 50% of the throughput. Such an approach is counter-intuitive to the teachings of Lau, who hopes to approach (in an ideal world) 100% throughput with no pipelining. Thus, the key feature distinguishing the claimed subject matter from Lau is that no access node or repeater transmits and receives *at the same time*. Consequently, off-the-shelf standard transceivers can be used, existing protocol channel allocations can be used (i.e. no guard bands are required), and all channels that are available can be used (i.e. there is no restriction on channel adjacency).

Heinonen likewise fails to teach receiving and transmitting at alternating or staggered (i.e., odd/even) time intervals. Heinonen instead teaches a Bluetooth repeater that may receive Bluetooth communications from an originating Bluetooth enabled device within range and then forward the same data to an intended recipient

outside the range of the originating Bluetooth enabled device. Although Bluetooth is a radio frequency (RF) technology that operates at 2.4 GHz and is capable of transmitting voice and data, the effective range of Bluetooth devices is very short (e.g., 10 meters) and Bluetooth transfers data at the limited rate of about 1 Mbps, which is far less than what is needed for high-quality, high-bandwidth video transmissions using any known technology today, let alone at the time of Applicant's invention. Note that amended claims 45, 51 and 55 recite downstream transmission at a data rate of at least 11Mbps, which Heinonen cannot achieve.

Heinonen also fails to teach any protocol or scheme for avoiding frequency interference so as to not compromise data throughput through the network. Rather, Heinonen's purpose is to extend the range of Bluetooth devices by use of standard repeaters, without any concern to the impact this extension of range would have on data throughput. Given that Bluetooth was designed for low-bandwidth devices (e.g., input peripherals and audio devices) this is a reasonable trade-off since maximizing throughput is rarely a concern for Bluetooth applications. But Heinonen's approach would necessarily defeat the throughput data rate of a wireless repeater network attempting to approach the maximum throughput that is available in the wireless spectrum. In other words, Heinonen fails to teach transmitting and re-transmitting packets at a data rate of 11Mbps or greater in a pipelined manner as recited, for example in amended claims 45, 51 and 55.

It should be noted that while the Figs. 1A and 1B of Heinonen bear visual resemblance to Figs. 2A, 2B in Applicant's specification, the meaning of the concentric circles is quite different. In Heinonen Figs. 1A and 1B, the small circle in the center identifies a wireless Bluetooth device, and the large circle, its area of *coverage* (the extreme range where data at any rate can be transmitted (or in other words, its range of *minimum* throughput) (*see* column 3, lines 39-60). This is

distinguished from Applicant's disclosure, where in Figs. 2A and 2B the tiny square in the center identifies a wireless device, the small circle indicates its range of *maximum* throughput, and the large circle indicates its range where it causes interference to other wireless devices.

Heinonen tacitly assumes that the various Bluetooth devices will use frequencies which interfere with one another, and will utilize the protocols within Bluetooth for the various devices to share the channel. For example, in column 13, lines 56-59, he states:

> In such an embodiment, a multitude of user devices can simultaneously send messages and the messages will be properly correlated by the Bluetooth repeater.

But Heinonen fails to teach or disclose how the simultaneous use of the channel by multiple uncoordinated devices can be achieved without reducing the throughput of the channel. Instead, Heinonen teaches away from maintaining a high data rate over a wireless network topology by disclosing the *opposite*: a system of repeaters for transmitting data at minimum throughput over an extended coverage range.

Applicant respectfully submits that a person of ordinary skill in the communications art would have understood that achieving a high specified data rate is largely irrelevant in the applications contemplated by Heinonen. Indeed, Heinonen's repeaters are designed to work at the maximum range of the Bluetooth devices, where the bandwidth is at its *minimum*. Furthermore, such a person would have appreciated that Heinonen's system of Bluetooth repeaters would be incapable of carrying real-time audiovisual content (e.g., HDTV video signals) at any rate approaching that of the subject claims. In other words, a person of ordinary skill in the art would have understood that adopting Heinonen's approach would render a wireless network transmitting media packets at a high rate essentially useless. A user watching HDTV programming on Heinonen's system would see the video stagger and

sputter as the high bandwidth data pipeline was compromised with random and competing bandwidth demands on the repeater, as well as retries for colliding transmissions, resulting in an unusable television viewing experience. A person of ordinary skill in the art would therefore have been discouraged or dissuaded from attempting to achieve Applicant's claimed invention in view of any possible combination of Heinonen with Lau.

Applicant respectfully submits that for all the reasons given above that a person of ordinary skill in the art considering the cited prior art references at the time of Applicant's invention would have not been led to, or able to achieve, the subject matter of Applicant's amended claims.

Accordingly, Applicant respectfully requests that the rejections under 35 U.S.C. § 103(a) be withdrawn. Applicant respectfully submits that all remaining claims are now in condition for allowance.

Please charge any shortages of fees or credit any overcharges of fees to our Deposit Account No. 50-2060.

Respectfully submitted,
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